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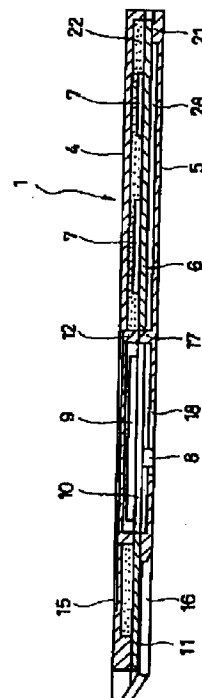
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(54)【発明の名称】 記録媒体カード及びその製造方法

(57)【要約】

【課題】 曲げ応力やひねり応力等の外部ストレスに対して十分な強度を有すると共に、カードの寸法仕様を満足することのできるメモリカード及びその製造方法を得る。

【解決手段】 上ハーフ4と下ハーフ5とにより合体式に構成されるようにした外装筐体3と、この外装筐体3内に一面にチップ部品7及びスライドスイッチ9が実装されていると共に、一端側に外装筐体3から接続端子11が露出するように外装されるようにした回路基板6を有し、上ハーフ4及び下ハーフ5の内面に上記スライドスイッチ9及び接続端子11が位置するエリアをダム材によって隔離した状態で熱硬化性の接着性充填材22、28を充填し、上ハーフ4及び下ハーフ5で回路基板6を挟み付けて合体し加熱処理することによって、外装筐体3と回路基板6とが硬化した熱硬化性充填材22、28と共に一体化されるようにしたメモリカード、及びその製造方法。



4 上ハーフ
5 下ハーフ
6 回路基板
7 チップ部品
9 スライドスイッチ
11 接続端子
22, 28 接着性充填材

【特許請求の範囲】

【請求項 1】 上ハーフと下ハーフとにより合体式に構成されるようにした外装筐体と、
上記外装筐体内に収納され、少なくとも一面にチップ部品及び切換え操作部を有するスイッチ部品が実装されていると共に、一端側に上記外装筐体から露出する接続端子を備えている回路基板とを有し、上記外装筐体の上ハーフ及び下ハーフの内面に熱硬化性充填材を充填し、この上ハーフ及び下ハーフで上記回路基板を挟み付けて合体することで、上記外装筐体と上記回路基板とが上記熱硬化性充填材と共に一体化されることを特徴とする記録媒体カード。

【請求項 2】 請求項 1 記載の記録媒体カードにおいて、
上記接続端子及びスイッチ部品との境界部分の上記ハーフ内面に粘性の高い熱硬化性樹脂のダム材を形成し、上記熱硬化性充填材が上記接続端子及びスイッチ部品へ充填されないようにしていることを特徴とする記録媒体カード。

【請求項 3】 請求項 1 記載の記録媒体カードにおいて、
上記外装筐体の上ハーフ及び下ハーフの裏面長手方向に筋状の溝を形成することで、上記熱硬化性充填材の流動の方向性と充填量の均一化を可能にすることを特徴とする記録媒体カード。

【請求項 4】 請求項 1 記載の記録媒体カードにおいて、
上記チップ部品が実装された側と対応するハーフ裏面を仕切壁により複数の区画室を形成し、各区画室に対応する上記チップ部品の容積に応じて当該区画室への上記熱硬化性充填材の充填量を調整することを特徴とする記録媒体カード。

【請求項 5】 上ハーフ及び下ハーフとからなる合体式の外装筐体内にチップ部品を実装した回路基板を収納した記録媒体カードの製造方法であって、
上記外装筐体の上ハーフ及び下ハーフ内面に熱硬化性充填材を充填し、この上ハーフ及び下ハーフで上記回路基板を挟み付けて合体し、上記熱硬化性充填材を熱処理し硬化することで、上記外装筐体と上記回路基板とが硬化した上記熱硬化性充填材と共に一体化されることを特徴とする記録媒体カードの製造方法。

【請求項 6】 請求項 5 記載の記録媒体カードの製造方法において、
上記接続端子及びスイッチ部品との境界部分の上記ハーフ内面に粘性の高い熱硬化性樹脂のダム材を形成し、上記熱硬化性充填材が上記接続端子及びスイッチ部品へ充填されないようにしていることを特徴とする記録媒体カードの製造方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、例えばメモリカード等の PC カードに使用して好適な記録媒体カード及びその製造方法に関し、詳しくは、超小型化及び薄型化を可能にすると共に、曲げ応力及びびねり応力に優れた記録媒体カード及びその製造方法に関する。

【0002】

【従来の技術】 近年、例えばコンピュータ機器や AV (Audio Visual) 機器等の外部の電子機器装置に挿脱可能にされ、半導体メモリや制御回路を内蔵した携帯型の記録媒体カードが普及している。詳しくは、この種の記録媒体カードは、基板に半導体メモリ等のチップ部品を実装し電子回路を構成した回路基板を、上ハーフ及び下ハーフからなるプラスチック成形材からなる外装筐体で外装して構成されている。

【0003】 図 13 は上述した記録媒体カードの一例を示したメモリカードの分離状態の斜視図である。符号 30 が外装筐体の一方側を構成する上ハーフ、31 が外装筐体の他方側を構成する下ハーフであり、符号 32 がこれら両ハーフ 30、31 により外装される回路基板である。この回路基板 32 の裏面に半導体メモリ等のチップ部品 33 がむき出し状にベア実装され電子回路を構成している。

【0004】 ここで、回路基板 32 は下ハーフ 31 に形成した位置決めピン 34、34 に位置決め孔 35、35 が位置決めされて収納され、この下ハーフ 31 に上ハーフ 30 を接合し、両ハーフ 30、31 の外周部の接合面 30a、31a を超音波溶着することによって一体に合体されメモリカードが構成される。尚、回路基板 32 の一端側裏面には接続端子 36 が設けられ、この接続端子 36 が下ハーフ 31 に形成した窓孔 37 から露出し、外部の電子機器装置と電気的に接続される。このように構成したメモリカードは、長手方向の長さ W_1 が 50 mm、短手方向の長さ W_2 が 21.5 mm、厚み D_1 は 2.8 mm である。

【0005】

【発明が解決しようとする課題】 ところで、上述したメモリカードは、回路基板 32 を外装している上下両ハーフ 30、31 の外周部接合面が超音波溶着されている構造であり、しかも、上下両ハーフ 30、31 自体も薄肉であるので、例えばメモリカードの曲げ応力やひねり応力等の断面二次モーメントに対して限界があり、いわゆる、外部ストレスに対して耐え得る強度が不十分である。

【0006】 また、上下両ハーフ 30、31 の外周部接合面を超音波溶着する方法は、接合面以外の両ハーフの特に中央部分が膨れ上がったり、逆に凹んだりしてメモリカード自体の寸法仕様を満足することができないこともある。

【0007】 さらに、超音波溶着による方法では、高周波振動により例えば、回路基板上に実装したチップ部品

の破損を生じる可能性がある。

【0008】本発明は、上述したような課題を解消するためになされたもので、曲げ応力やひねり応力等の外部ストレスに対して十分な強度を有すると共に、カードの寸法仕様を満足することのできる記録媒体カード及びその製造方法を得ることを目的とする。

【0009】

【課題を解決するための手段】上述の目的を達成するため本発明による記録媒体カードは、上ハーフと下ハーフとにより合体式に構成される外装筐体と、チップ部品等が実装されている回路基板とを有し、外装筐体の上ハーフ及び下ハーフの内面に熱硬化性充填材を充填し、この上ハーフ及び下ハーフで回路基板を挟み付けて合体することで、外装筐体と回路基板とを熱硬化性充填材と共に一体化されるようにしたものである。

【0010】上述した記録媒体カードによれば、回路基板と共に実装したチップ部品等が熱硬化性充填材によりモールドされ、外装筐体と回路基板とを電気絶縁性の熱硬化性充填材と共に一体化されることで、記録媒体カードの曲げ応力及びひねり応力等の外部ストレスに対して十分に耐え得る強度を有することができる。しかも、熱硬化性充填材により密閉されていることから、チップ部品等の防湿及び防水機能と共に、チップ部品のリード端子を断線から保護することができる。

【0011】また、本発明の記録媒体カードは、接続端子及びスイッチ部品との境界部分のハーフ内面に粘性の高い熱硬化性樹脂のダム材を形成し、熱硬化性充填材が接続端子及びスイッチ部品へ充填されないようにしている。

【0012】また、本発明の記録媒体カードは、外装筐体の上ハーフ及び下ハーフの裏面長手方向に筋状の溝を形成することで、熱硬化性充填材の流動の方向性と充填量の均一化を可能にしている。

【0013】また、本発明の記録媒体カードは、チップ部品が実装された側と対応するハーフ裏面を仕切り壁により複数の区画室を形成し、各区画室に対応するチップ部品の容積に応じて当該区画室への熱硬化性充填材の充填量を調整する。

【0014】また、本発明の記録媒体カードの製造方法は、上ハーフ及び下ハーフとからなる合体式の外装筐体内にチップ部品を実装した回路基板を収納した記録媒体カードの製造方法であって、外装筐体の上ハーフ及び下ハーフ内面に熱硬化性充填材を充填し、この上ハーフ及び下ハーフで上記回路基板を挟み付けて合体し、熱硬化性充填材を熱処理し硬化することで、外装筐体と回路基板とが硬化した熱硬化性充填材と共に一体化される。

【0015】さらに、本発明の記録媒体カードの製造方法は、接続端子及びスイッチ部品との境界部分のハーフ内面に粘性の高い熱硬化性樹脂のダム材を形成し、熱硬化性充填材が接続端子及びスイッチ部品へ充填されない

ようにしている。

【0016】

【発明の実施の形態】以下、本発明による記録媒体カード及びその製造方法の実施の形態をメモリカード及びその製造方法を例にとって図面を参照して説明する。

【0017】図1はメモリカードを表面側より見た外観斜視図、図2は同じく裏面側より見た外観斜視図、図3はメモリカードの外装筐体である上ハーフと下ハーフと回路基板との分離状態の外観斜視図、図4は上ハーフを裏面側より見た外観斜視図、図5は図1のA-A線拡大断面図である。

【0018】メモリカードの全体を符号1で示し、メモリカード1の挿入方向側を矢印マーカー2で示す。メモリカード1の外装筐体3は上ハーフ4と下ハーフ5との2枚のハーフで合体式に構成され、外装筐体3は耐薬品性及び機械的強度の高い例えば、ポリブチレンテレフタレート（PBT）から射出成形されている。ここで、メモリカード1のサイズは挿入方向と平行する長手方向の辺の長さ W_1 は31mm、挿入方向と直交する短手方向の辺の長さ W_2 は20mm、厚み D_2 が1.6mmに規格されている。

【0019】上述した外装筐体3内に回路基板6が内蔵されている。回路基板6はガラスエポキシ基板からなるマザーボードに配線パターンが形成され、この回路基板6の上面側に半導体メモリ等の複数のチップ部品7がバア実装され電子回路を構成している。また、回路基板6の上面側には半導体メモリへのデータの書き込み禁止及び書き込み可能を設定するための切替つまみ8を有する誤消去防止用のスライドスイッチ9が開口窓10を跨がるようにして実装されている。さらに、回路基板6の下面側には挿入方向側の先端部に複数の接続端子11がパターン形成されている。

【0020】さて、外装筐体3の上ハーフ4は、図4に示すように外周部に側壁4aを有し、裏面に上述したスライドスイッチ9の収容部4bを包囲するリブ壁12が側壁4aと同一高さに形成されている。また、上ハーフ4の後部側壁に一对のリブ状突起13、13が形成されていると共に、上ハーフ4の前部側に位置決め突起14が形成されている。尚、符号15は上ハーフ4の表面に形成されているラベルエリアである。

【0021】外装筐体3の下ハーフ5は、外周部に側壁5aを有し、下ハーフ5の先端側にスリット状の複数の窓孔16が形成され、この窓孔16から上述した回路基板6の接続端子11が下ハーフ5の下面より露出するようにされている。また、下ハーフ5の裏面に上述したスライドスイッチ9の収容部5bを包囲するリブ壁17が形成され、このリブ壁17で囲まれた下ハーフ5の部分にスライドスイッチ9の切替つまみ8が臨む凸孔18が形成されている。さらに、下ハーフ5の後部側壁に上ハーフ4のリブ状突起13、13と係合される一对の凹部1

9、19と、上ハーフ4の位置決め突起14と係合される凹溝20が形成されている。

【0022】ここで、外装筐体3の上ハーフ4と下ハーフ5とにより挟み込まれて収納される回路基板6は、下ハーフ5の窓孔16の面部16a、リブ壁17の上面及び段部21、21上に当接し、回路基板6の下面が実質的に下ハーフ5の裏面と所定の間隙を有するようにされている。この間隙に後述するメモリカード1の組付け工程において熱硬化性樹脂からなる例えばエポキシ系樹脂の接着性充填材が充填される。

【0023】また、上ハーフ4はリブ壁12が回路基板6の上面に当接すると共に、上ハーフ4の外周部の側壁4aが下ハーフ5の外周部の側壁5aに接合され、回路基板6の上面に実装されているチップ部品7及びスライドスイッチ9の上面が上ハーフ4の裏面と所定の間隙を有するようにされている。この間隙を含む回路基板6上の空間に後述するメモリカード1の組付け工程において熱硬化性樹脂からなるエポキシ系樹脂の接着性充填材が充填される。

【0024】次に、図6a～図6dを参照してメモリカード1の製造手順について説明する。尚、図では図1においてB-B線からメモリカード1を短手方向に切断した断面図を示してある。

【0025】まず、図6aに示すように上ハーフ4を裏返しにし、この上ハーフ4の裏面内に接着性充填材22をポッティング状態に所定量充填する。この接着性充填材22は比較的粘性があり、従って、充填状態では上ハーフ4の全面に流れ出すこともなくポッティング状に留まる。かくして、チップ部品7及びスライドスイッチ（図示せず）を実装した回路基板6を、その実装側を下向きにして接着性充填材22を充填した上ハーフ4に押し付けながら組付ける。この組付け操作により、接着性充填材22は下ハーフ4の全面に流動し図6bに示すように回路基板6と上ハーフ4との空間内全体に充填する。

【0026】この際、上ハーフ4の空間内に充填した接着性充填材22は、スライドスイッチ9の収容部4bを包囲するリブ壁12によって阻止され、スライドスイッチ9側に接着性充填材22の流入を防止している。尚、上ハーフ4に接着性充填材22を充填する前に図7に示すようにリブ壁12の周囲に予め接着性充填材22より粘性の高いダム材23を塗布することによって、接着性充填材22がダム材23に阻止され、収容部4b内への接着性充填材22の流入を効果的に防止することができる。

【0027】また、上ハーフ4に回路基板6を組付けたとき、上ハーフ4から接着性充填材22が漏れ出さないように、下ハーフ4の容積に対してチップ部品7の体積を計算して接着性充填材22の充填量が決められる。

【0028】また、上ハーフ4に図8に示すように裏面

長手方向に並行する細溝24を形成することによって、接着性充填材22を充填した上ハーフ4に回路基板6を押し付けて組付けたとき、接着性充填材22が細溝24に沿って流動しやすくなり、これによって、上ハーフ4のスライドスイッチ収容部4b以外に接着性充填材22を均一に充填させることができる。尚、細溝24の形状としては図9aに示すような円弧状溝24aであったり、あるいは図9bに示すようにV溝24bでもよく、その他の溝形状でもよい。

10 【0029】また、チップ部品7が対応する上ハーフ4内に接着性充填材22を充填する別の充填方法として、図10及び図11aに示すように上ハーフ4の裏面を仕切壁25により複数の例えば3つの区画室25a、25b、25cに形成し、各区画室25a、25b、25cに対応するチップ部品の容積に応じ、それぞれの区画室25a、25b、25cへ充填する熱硬化性充填材の接着性充填材の充填量を調整するものである。例えば、区画室25aには対応するチップ部品の容積が小さいので接着性充填材22は多い充填量となり、区画室25bには対応するチップ部品の容積が大きいので接着性充填材22は少ない充填量となり、区画室25cには対応するチップ部品の容積が小さいので接着性充填材は多い充填量となる。

【0030】このように各区画室25a、25b、25cに応じて接着性充填材22の充填量を調整することで、上ハーフ4に回路基板6を組付けたとき接着性充填材22が区画室から漏れ出ることもなく、図11bに示すように各区画室へ確実に充填させることができる。

30 【0031】かくして、上ハーフ4と回路基板6とが組付けられた後、次に、下ハーフ5に図12に示すようにスライドスイッチの収容部5bを包囲するリブ壁17から接続端子の窓孔16側に亘って上ハーフ4に塗布したダム材23と同様の粘性を有するダム材27を塗布し、この後、図6cに示すように下ハーフ5の裏面内に接着性充填材28をポッティング状態に所定量充填する。この接着性充填材28も接着性充填材22と同様の粘性があり、充填状態では下ハーフ5の全面に流れ出すこともなくポッティング状に留まる。そして、下ハーフ5に先に図6bに示したように回路基板6を組付けた上ハーフ4を、回路基板6を下向きにして押し付けながら合体し組付ける。この組付け操作により、接着性充填材28は下ハーフ5の全面に流動し図6dに示すように下ハーフ5の空間内全体に充填し、本発明によるメモリカードが組付けられる。

【0032】この際、下ハーフ5の空間内に充填した接着性充填材28は、ダム材27によって阻止されスライドスイッチ9及び回路基板6の接続端子11側へ流入しないようにしている。

【0033】また、下ハーフ5の裏面にも上ハーフ4の場合と同様に長手方向に沿って細溝29を形成すること

によって、接着性充填材 28 が細溝 29 に沿って流動しやすくなり、これによって、下ハーフ 5 のスライドスイッチ収容部 5b 以外に接着性充填材 28 を均一に充填させることができる。

【0034】この場合も下ハーフ 5 から充填材 25 が漏れ出さないように、下ハーフ 5 の容積を計算して充填材 28 の充填量が決められる。

【0035】かくして、図 6d に示したように組付けられたメモリカードは、上ハーフ 4 と下ハーフ 5 とを図示しない押さえ手段により合体した状態を保持して 70℃ の加熱炉内に 30 分投入して接着性充填材 22 及び 28 の硬化処理を行う。この後、上ハーフ 4 と下ハーフ 5 とを押さえ手段のない状態で 100℃ の加熱炉内に 3～4 時間投入する。これにより、上ハーフ 4 と下ハーフ 5 及び回路基板 6 が完全に硬化した接着性充填材 22、28 で一体化されたメモリカード 1 が製作される。尚、接着性充填材 22 及び 28 の硬化温度は 100℃ 以下であるため、上下ハーフ 4、5 がポリブチレンテレフタレートから成形されていることで軟化による形状変形も生じない。

【0036】以上のように製作されたメモリカード 1 は、チップ部品 7 が実装された回路基板 6 が熱硬化性の接着性充填材 22、28 で完全に密閉され、上ハーフ 4 と下ハーフ 5 とで外装され一体化するようにした構成であるので、上ハーフ 4 及び下ハーフ 5 の肉厚を極めて薄くすることができることから、メモリカード 1 として極薄型化と共に超小型化を図ることができ、特に、曲げ応力及びひねり応力に対する強度が極めて向上し携帯用に適した信頼性の高いメモリカードとなる。

【0037】また、回路基板 6 にベア実装されたチップ部品 7 が接着性充填材 22、28 で完全に密閉されていることで、回路基板 6 とチップ部品 7 との半田固定部の信頼性が向上できることはもとより、ベア実装されたチップ部品 7 の紫外線による劣化から保護し、しかも、静電破壊等の外的ダメージからも保護することができる。

【0038】また、上ハーフ 4 や下ハーフ 5 の裏面に形成した細溝 24 や 29 は、接着性充填材の流れに方向性を持たせてハーフへ均一に充填できることはもとより、充填材のウエルド（異なる方向から充填材が合流したときの接合部）の発生もなく、これによって、充填材の粒子を整列させることができることから接着性充填材が硬化処理されたときの強度の向上を図ることができる。

【0039】本発明は、上述しかつ図面に示した実施の形態に限定されるものでなく、その要旨を逸脱しない範囲内で種々の変形実施が可能である。

【0040】上ハーフ 4 や下ハーフ 5 と接着性充填材との密着性は、充填材の流れに方向性を持たせるために形成した細溝 24 や 29 によって表面積が拡大されることを利用して密着強度を向上させることができるが、その他、ハーフ面にシボ等の凹凸面を有する、いわゆるブラ

スト加工を施して密着強度を図るようにしてもよい。

【0041】また、回路基板 6 への実装部品としてパッケージ部品やベア部品の表面実装あるいはディスリット実装であっても広く適用可能である。

【0042】さらに、本例では回路基板 6 の一面にチップ部品 7 等を実装した場合について説明したが、勿論、回路基板 6 の両面にチップ部品 7 等が実装されることであっても上述した成形方法と同様の手順により製作することができる。

【0043】また、メモリカード 1 の成形手順として、接着性充填材 28 を充填した下ハーフ 5 に先に回路基板 6 を組付け、この後、接着性充填材 22 を充填した上ハーフ 4 に回路基板 6 の部品実装面側を組付け一体化することであってもよい。

【0044】尚、本発明の実施形態では熱硬化性の接着性充填材を充填した上ハーフ 4 と下ハーフ 5 で回路基板 6 を挟み付けて一体化することの特徴とするものであるが、別の方法として、上ハーフ 4 及び下ハーフ 5 で回路基板 6 を挟み付けて合体し、この後、上した両ハーフ 4、5 と回路基板 6 との空間内に接着性充填材を注入により充填することも可能である。この場合、スライドスイッチ 9 や接続端子 11 に接着性充填材が流入しないように前述と同様に予めダム材が形成されている。

【0045】

【発明の効果】以上説明したように本発明による記録媒体カードは、上ハーフと下ハーフとにより合体式に構成される外装筐体と、チップ部品等が実装されている回路基板とを有し、外装筐体の上ハーフ及び下ハーフの内面に熱硬化性充填材を充填し、この上ハーフ及び下ハーフで回路基板を挟み付けて合体することで、外装筐体と回路基板とを熱硬化性充填材と共に一体化されるようにしたので、超小型化及び薄型化を可能にし、曲げ応力及びひねり応力等の外部ストレスに対して十分に耐え得る強度を有し、携帯に便利な記録媒体カードとなる。

【0046】また、本発明による記録媒体カードの製造方法は、外装筐体の上ハーフ及び下ハーフ内面に熱硬化性充填材を充填し、この上ハーフ及び下ハーフで回路基板を挟み付けて合体し、熱硬化性充填材を熱処理し硬化することで、外装筐体と回路基板とが硬化した熱硬化性充填材と共に一体化されるようにしたので、超小型化及び薄型化を可能にし、曲げ応力及びひねり応力等の外部ストレスに対して十分に耐え得る強度を有し、携帯に便利な記録媒体カードを製作することができる。

【図面の簡単な説明】

【図 1】本発明の実施形態によるメモリカードを上面側から見た外観斜視図である。

【図 2】同じくメモリカードを下面側から見た外観斜視図である。

【図 3】メモリカードを分離した状態の外観斜視図である。

【図4】外装筐体の上ハーフを裏面側から見た外観斜視図である。

【図5】メモ리카ードを図1のA-A線から切断した拡大断面図である。

【図6】a 接着性充填材を充填した上ハーフへ回路基板の組付け前の断面図である。

b 上ハーフに回路基板を組付けた断面図である。

c 下ハーフに接着性充填材を充填した断面図である。

d 接着性充填材を充填した下ハーフに回路基板と共に上ハーフを組付けた断面図である。

【図7】リブ壁の回りにダム材を形成した上ハーフの裏面図である。

【図8】ハーフ裏面に細溝を形成した上ハーフの裏面図である。

【図9】a 細溝の一例の一部拡大断面図である。

b 細溝の別の例の一部拡大断面図である。

* 【図10】区画室毎に接着性充填材を充填する別の例を示した上ハーフの裏面図である。

【図11】a 同じく区画室に接着性充填材を充填した上ハーフに回路基板の組付け前の断面図である。

b 上ハーフに回路基板を組付けた断面図である。

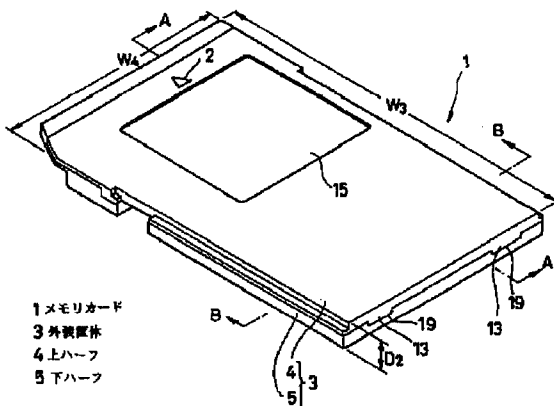
【図12】リブ壁及び接続端子の回りにダム材を形成した下ハーフの裏面図である。

【図13】従来のメモ리카ードの分離状態の外観斜視図である。

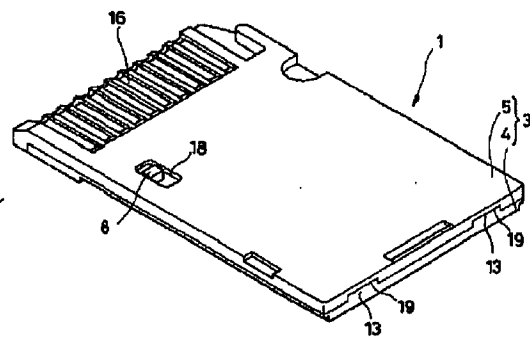
10 【符号の説明】

1…メモ리카ード、3…外装筐体、4…上ハーフ、5…下ハーフ、6…回路基板、7…チップ部品、9…スライドスイッチ、11…接続端子、12…上ハーフのリブ壁、17…下ハーフのリブ壁、22, 28…接着性充填材、23, 27…ダム材、24, 29…細溝、25…仕切壁、25a, 25b, 25c…区画室

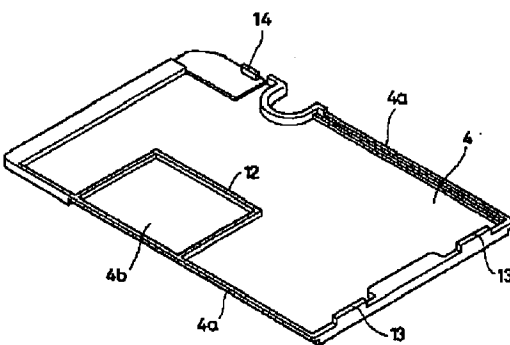
【図1】



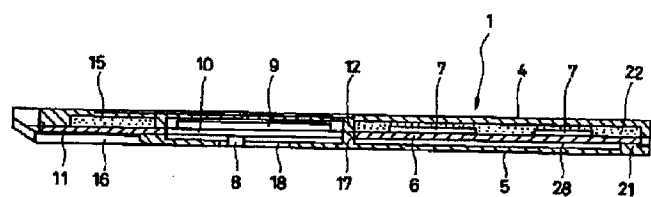
【図2】



【図4】

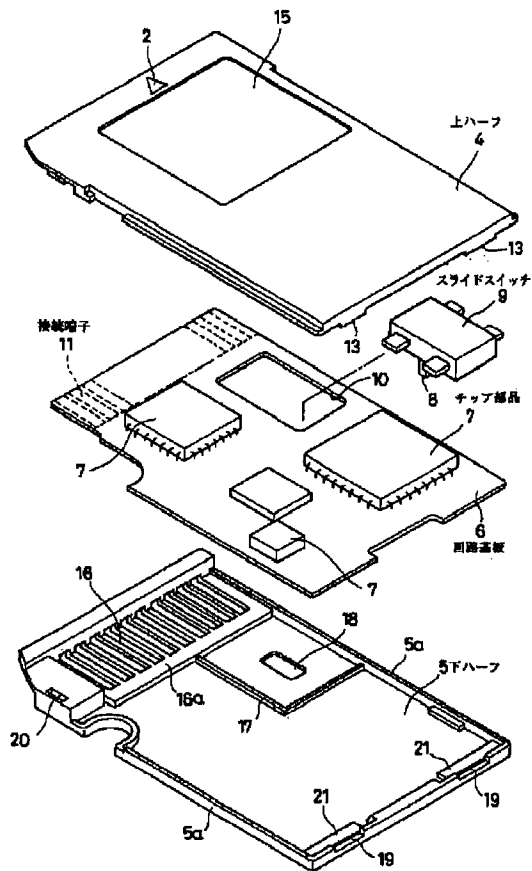


【図5】

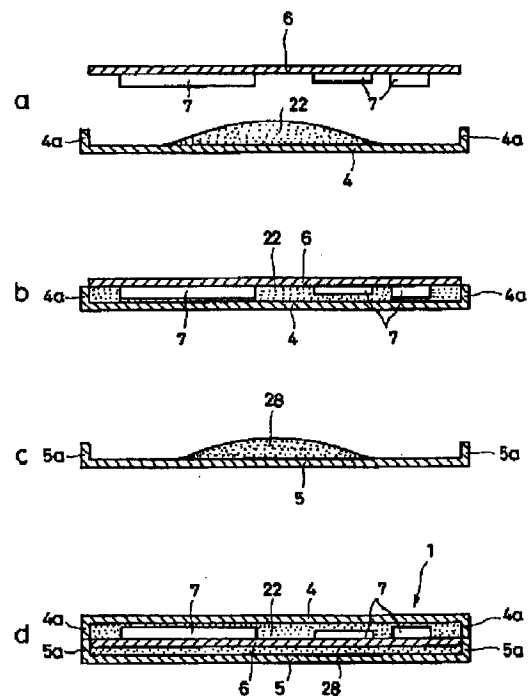


- 4 上ハーフ
- 5 下ハーフ
- 6 回路基板
- 7 チップ部品
- 9 スライドスイッチ
- 11 接続端子
- 22, 28 接着性充填材

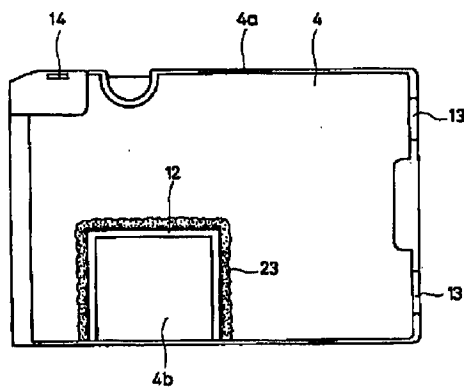
【図3】



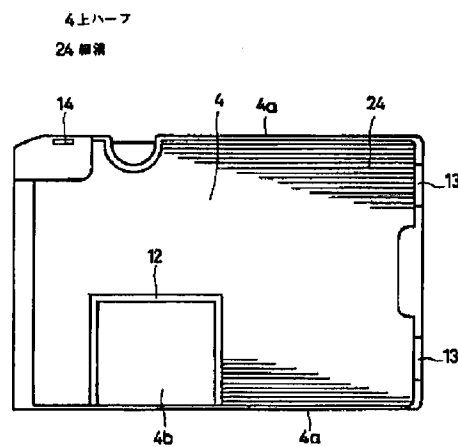
【図6】



【図7】

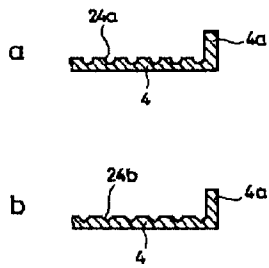


【図8】

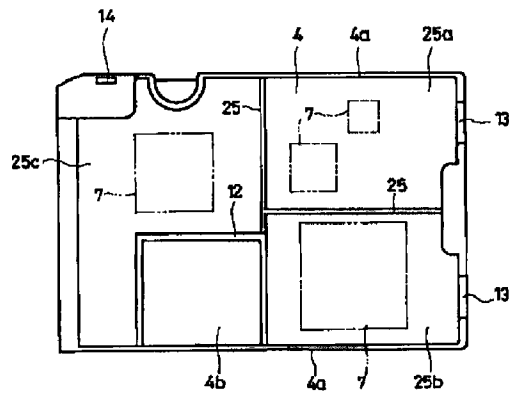


4 上ハーフ
4b スイッチ取寄部
23 ゼム材

【図9】

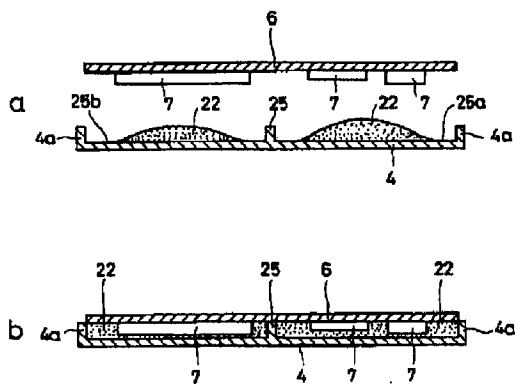


【図10】

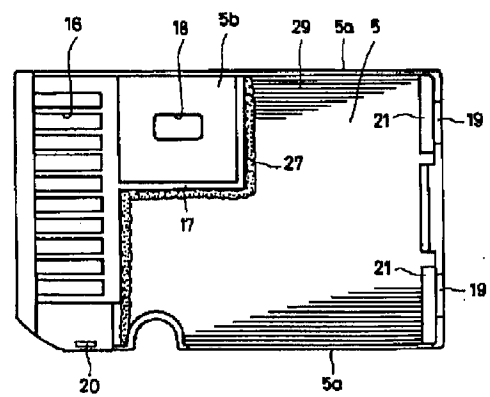


4 上ハーフ
7 チップ部品
25 仕切壁
25a, 25b, 25c 区画室

【図11】

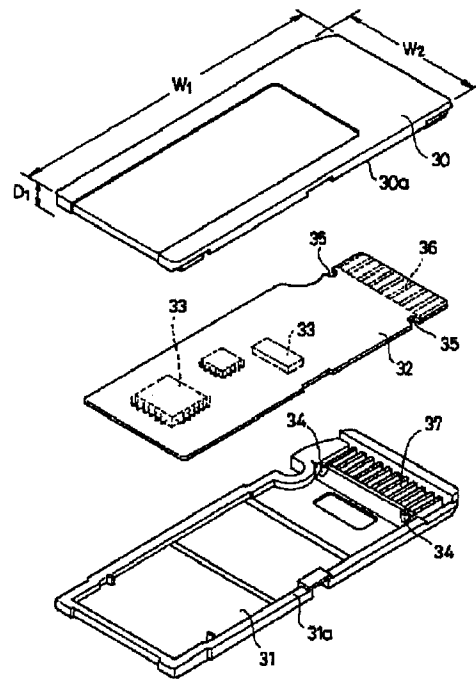


【図12】



5 下ハーフ
5b スイッチ収容部
16 接続端子の窓孔
27 ゴム材
29 絶縁

【図13】



フロントページの続き

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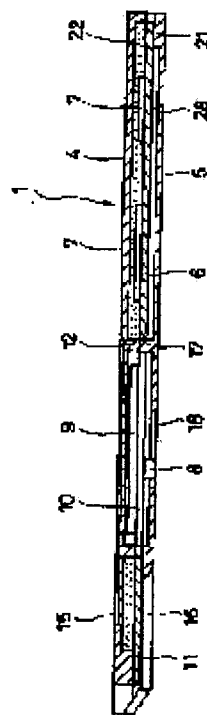
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TANABE YASUhide

(54) RECORDING MEDIUM CARD AND MANUFACTURING METHOD THEREFOR

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a memory card and the manufacturing method, which have sufficient strength against outer stress such as bend stress and twist stress and can satisfy the size specification of the card.

SOLUTION: In the memory card and the manufacturing method, an armor casing 3 constituted in an incorporated type by an upper half 4 and a lower half 5 is installed, chip parts 7 and a sliding switch 9 are loaded on one face in the armor casing 3 and a circuit board 6 where a connection terminal 11 is exposed from the armor casing 3 is installed at one end side. The inner faces of the upper half 4 and the lower half 5 are filled with thermosetting adhesive fillers 22 and 28 in a state where an area where the sliding switch 9 and the connection terminal 11 are positioned is detached by a dam material. The circuit board 6 is sandwiched by the upper half 4 and the lower half 5 and they are incorporated and heated. Thus, the armor casing 3 and the circuit board 6 are incorporated with the cured thermosetting fillers 22 and 28.



4 上ハーフ
5 下ハーフ
6 回路基板
7 チップ部品
9 スライドスイッチ
11 接続端子
22, 28 熱硬化性接着剤

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CLAIMS

[Claim(s)]

[Claim 1]A part of switch characterized by comprising the following is mounted, and. By having the circuit board provided with a contact button exposed to the end side from the above-mentioned outer jacket case, filling up an inner surface of an upper half of the above-mentioned outer jacket case, and a lower half with a thermosetting filler, pinching the above-mentioned circuit board and uniting by this upper half and lower half. A recording-medium card, wherein the above-mentioned outer jacket case and the above-mentioned circuit board are unified with the above-mentioned thermosetting filler.

An outer jacket case constituted by union type by upper half and a lower half.

It is stored by the above-mentioned exterior chassis inside of the body, and they are a chip and a switching operation part to the whole surface at least.

[Claim 2]A recording-medium card forming a dam material of viscous high thermosetting resin in the above-mentioned contact button and the above-mentioned half inner surface of a boundary part with a part of switch, not filling up with the above-mentioned thermosetting filler in the recording-medium card according to claim 1 to the above-mentioned contact button and a part of switch, and making.

[Claim 3]A recording-medium card characterized by enabling equalization of the directivity of a flow of the above-mentioned thermosetting filler, and a fill ration by forming a muscle-like slot in a rear-face longitudinal direction of an upper half of the above-mentioned outer jacket case, and a lower half in the recording-medium card according to claim 1.

[Claim 4]Two or more compartments are formed for a half rear face corresponding [side in which the above-mentioned chip was mounted] in the recording-medium card according to claim 1 with a bridge wall, A recording-medium card adjusting a fill ration of the above-mentioned thermosetting filler to the compartment concerned according to capacity of the

above-mentioned chip corresponding to each compartment.

[Claim 5]It is a manufacturing method of a recording-medium card which stored the circuit board which mounted a chip in the exterior chassis inside of the body of a union type which consists of an upper half and a lower half, By filling up an upper half and a lower half inner surface of the above-mentioned outer jacket case with a thermosetting filler, pinching the above-mentioned circuit board, uniting by this upper half and lower half, and heat-treating and hardening the above-mentioned thermosetting filler. A manufacturing method of a recording-medium card unifying with the above-mentioned thermosetting filler which the above-mentioned outer jacket case and the above-mentioned circuit board hardened.

[Claim 6]In a manufacturing method of the recording-medium card according to claim 5, a dam material of viscous high thermosetting resin is formed in the above-mentioned contact button and the above-mentioned half inner surface of a boundary part with a part of switch, A manufacturing method of a recording-medium card, wherein it does not fill up with the above-mentioned thermosetting filler to the above-mentioned contact button and a part of switch and it is making.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]Use this invention, for example for PC cards, such as a memory card, and it enables microminiaturization and slimming down in detail about a suitable recording-medium card and a manufacturing method for the same, and it relates to a recording-medium card excellent in bending stress and twist stress, and a manufacturing method for the same.

[0002]

[Description of the Prior Art]The insertion and detachment to the electronic equipment device of the exteriors, such as recent years, for example, computer apparatus, and AV (Audio Visual) apparatus, are enabled, and the portable recording-medium card which contained semiconductor memory and a control circuit has spread. In detail, this kind of recording-medium card carries out the exterior of the circuit board which mounted chips, such as semiconductor memory, in the substrate and constituted the electronic circuit with the outer jacket case which consists of plastic-molding material which consists of an upper half and a lower half, and is constituted.

[0003]Drawing 13 is a perspective view of the separation state of the memory card in which an example of the recording-medium card mentioned above was shown. The numerals 30 are an upper half who constitutes the one side of an outer jacket case, and a lower half from whom 31 constitutes the other side of an outer jacket case, and the numerals 32 are the circuit board in which the exterior is done by these both the halves 30 and 31. Raise in basic wages mounting of the chips 33, such as semiconductor memory, is carried out at the rear face of this circuit board 32 at the letter of nakedness, and the electronic circuit is constituted.

[0004]The tooling holes 35 and 35 are positioned by the gage pins 34 and 34 formed in the lower half 31, and the circuit board 32 is stored here, The upper half 30 is joined to this lower half 31, by carrying out ultrasonic welding of the planes of composition 30a and 31a of both the

halves' 30 and 31 peripheral part, it unites to one and a memory card is constituted. The contact button 36 is formed in the end side rear face of the circuit board 32, and this contact button 36 is exposed from the window hole 37 formed in the lower half 31, and is electrically connected with an external electronic equipment device. 50 mm and length W_2 of the transverse direction are 21.5 mm, and, as for the memory card constituted in this way, length W_1 of a longitudinal direction of thickness D_1 is 2.8 mm.

[0005]

[Problem(s) to be Solved by the Invention]By the way, since the memory card mentioned above is the structure where ultrasonic welding of the peripheral part plane of composition of up-and-down both the halves 30 and 31 that are doing the exterior of the circuit board 32 is carried out and up-and-down both the halves 30 and 31 the very thing are moreover also thin meat, For example, the intensity which has a limit to geometric moments of inertia, such as bending stress, twist stress, etc. of a memory card, and can be borne to what is called external stress is insufficient.

[0006]The method of carrying out ultrasonic welding of up-and-down both the halves' 30 and 31 peripheral part plane of composition also has a thing of both halves other than a plane of composition for which a center portion in particular cannot swell up, or it cannot dent conversely, and size specification of the memory card itself cannot be satisfied.

[0007]In the method by ultrasonic welding, breakage of the chip mounted for example, on the circuit board by high frequency oscillation may be produced.

[0008]An object of this invention is to have been made in order to cancel SUBJECT which was mentioned above, to have sufficient intensity to external stress, such as bending stress and twist stress, and to obtain a recording-medium card with which it can be satisfied of the size specification of a card, and a manufacturing method for the same.

[0009]

[Means for Solving the Problem]In order to attain the above-mentioned purpose, a recording-medium card by this invention, It has an outer jacket case constituted by union type by upper half and a lower half, and the circuit board in which a chip etc. are mounted, An inner surface of an upper half of an outer jacket case and a lower half is filled up with a thermosetting filler, and it is made to unify an outer jacket case and the circuit board with a thermosetting filler by pinching the circuit board and uniting by this upper half and lower half.

[0010]According to the recording-medium card mentioned above, the mold of the chip etc. which were mounted with the circuit board is carried out with a thermosetting filler, and an outer jacket case and the circuit board by being unified with a thermosetting filler of electric insulation. It can have the intensity which can fully be borne to external stress, such as bending stress of a recording-medium card, and twist stress. And since it is sealed with a thermosetting filler, a lead terminal of a chip can be protected from an open circuit with

moisture proof and a waterproof function of a chip etc.

[0011]A recording-medium card of this invention forms a dam material of viscous high thermosetting resin in a contact button and a half inner surface of a boundary part with a part of switch, it does not fill up with a thermosetting filler to a contact button and a part of switch, and it is making it.

[0012]A recording-medium card of this invention is forming a muscle-like slot in a rear-face longitudinal direction of an upper half of an outer jacket case, and a lower half, and enables equalization of the directivity of a flow of a thermosetting filler, and a fill ration.

[0013]A recording-medium card of this invention forms two or more compartments for a half rear face corresponding [side in which a chip was mounted] with a bridgewall, and adjusts a fill ration of a thermosetting filler to the compartment concerned according to capacity of a chip corresponding to each compartment.

[0014]A manufacturing method of a recording-medium card of this invention, It is a manufacturing method of a recording-medium card which stored the circuit board which mounted a chip in the exterior chassis inside of the body of a union type which consists of an upper half and a lower half, An upper half and a lower half inner surface of an outer jacket case are filled up with a thermosetting filler, and by this upper half and lower half, the above-mentioned circuit board is pinched, and it unites, and is unified by heat-treating and hardening a thermosetting filler with a thermosetting filler which an outer jacket case and the circuit board hardened.

[0015]A manufacturing method of a recording-medium card of this invention forms a dam material of viscous high thermosetting resin in a contact button and a half inner surface of a boundary part with a part of switch, it does not fill up with a thermosetting filler to a contact button and a part of switch, and it is making it.

[0016]

[Embodiment of the Invention]Hereafter, the embodiment of a recording-medium card by this invention and a manufacturing method for the same is described with reference to drawings taking the case of a memory card and a manufacturing method for the same.

[0017]The appearance perspective view as which drawing 1 regarded the memory card from the surface side, the appearance perspective view which similarly looked at drawing 2 from the rear-face side, The appearance perspective view of the separation state of the upper half, the lower half, and the circuit board whose drawing 3 is an outer jacket case of a memory card, the appearance perspective view as which drawing 4 regarded the upper half from the rear-face side, and drawing 5 are the A-A line expanded sectional views of drawing 1.

[0018]The numerals 1 show the whole memory card and the arrow marker 2 shows the path-of-insertion side of the memory card 1. The outer jacket case 3 of the memory card 1 is constituted from two sheets' half of the upper half 4 and the lower half 5 by the union type,

chemical resistance and a mechanical strength are high, for example, injection molding of the outer jacket case 3 is carried out from polybutylene terephthalate (PBT). Here, as for length W_4 of the neighborhood of the transverse direction to which 31 mm, the path of insertion, and length W_3 of the neighborhood of the longitudinal direction to which the size of the memory card 1 is parallel to the path of insertion cross at right angles, the standard of 20 mm and the thickness D_2 is carried out to 1.6 mm.

[0019]The circuit board 6 is built in in the outer jacket case 3 mentioned above. A circuit pattern is formed in the mother board which consists of glass epoxy boards, raise in basic wages mounting of two or more chips 7, such as semiconductor memory, is carried out at the upper surface side of this circuit board 6, and the circuit board 6 constitutes the electronic circuit. In the opening window 10, as the slide switch 9 for erroneous erasure prevention which has the change knob 8 for the data to semiconductor memory being write-protected to the upper surface side of the circuit board 6, and setting up write-in **** straddles, it is mounted. Pattern formation of two or more contact buttons 11 is carried out to the tip part by the side of the path of insertion at the undersurface side of the circuit board 6.

[0020]Now, the upper half 4 of the outer jacket case 3 has the side attachment wall 4a in a peripheral part, as shown in drawing 4, and the rib wall 12 which surrounds the seat part 4b of the slide switch 9 mentioned above at the rear face is formed in the side attachment wall 4a and same height. The rib form projections 13 and 13 of the couple are formed in the upper half's 4 rear side attachment wall, and the locating lug 14 is formed in the upper half's 4 anterior part side. The numerals 15 are label area currently formed in the upper half's 4 surface.

[0021]The lower half 5 of the outer jacket case 3 has the side attachment wall 5a in a peripheral part, two or more slit shape window holes 16 are formed in the lower half's 5 tip side, and the contact button 11 of the circuit board 6 mentioned above from this window hole 16 is made to be exposed from the lower half's 5 undersurface. The rib wall 17 which surrounds the seat part 5b of the slide switch 9 mentioned above at the lower half's 5 rear face is formed, and the hole 18 which the change knob 8 of the slide switch 9 faces the lower half's 5 portion surrounded with this rib wall 17 is formed. The concave 20 which engages with the crevices 19 and 19 of the couple which engages with the lower half's 5 rear side attachment wall with the upper half's 4 rib form projections 13 and 13, and the upper half's 4 locating lug 14 is formed.

[0022]The circuit board 6 which is put by the upper half 4 and the lower half 5 of the outer jacket case 3, and is stored contacts on the surface part 16a of the lower half's 5 window hole 16, the upper surface of the rib wall 17, and the step 21 and 21, and he is trying for the undersurface of the circuit board 6 to have the lower half's 5 rear face, and a predetermined

gap substantially here. For example, it sets like the impression plaster of the memory card 1 later mentioned in this gap and consists of thermosetting resin, it fills up with the adhesive filler of epoxy system resin.

[0023]The rib wall 12 contacts the upper surface of the circuit board 6, and the upper half 4. The side attachment wall 4a of the upper half's 4 peripheral part is joined to the side attachment wall 5a of the lower half's 5 peripheral part, and he is trying for the upper surface of the chip 7 mounted in the upper surface of the circuit board 6 and the slide switch 9 to have the upper half's 4 rear face, and a predetermined gap. It fills up with the adhesive filler of the epoxy system resin which sets like the impression plaster of the memory card 1 later mentioned between circuit board including this gap 6 absentminded, and consists of thermosetting resin.

[0024]Next, the manufacture procedure of the memory card 1 is explained with reference to drawing 6 a - drawing 6 d. The figure has shown the sectional view which cut the memory card 1 from the B-B line to the transverse direction in drawing 1.

[0025]First, as shown in drawing 6 a, the upper half 4 is made inside-out, and the specified quantity restoration of the adhesive filler 22 is changed into a potting state into this upper half's 4 rear face. It stops in the shape of potting, without this adhesive filler 22 being viscous in comparison, therefore flowing out all over the upper half 4 in a filling state. It attaches forcing it on the upper half 4 who placed the mounting side for the circuit board 6 which mounted the chip 7 and the slide switch (not shown) upside down in this way, and was filled up with the adhesive filler 22. By this attachment operation, as it flows all over the lower half 4 and is shown in drawing 6 b, it is full of the adhesive filler 22 in [of the circuit board 6 and the upper half 4 / whole] space.

[0026]Under the present circumstances, the adhesive filler 22 which it was full of in the upper half's 4 space was prevented with the rib wall 12 which surrounds the seat part 4b of the slide switch 9, and has prevented the inflow of the adhesive filler 22 to the slide switch 9 side. By applying the viscous high dam material 23 to the circumference of the rib wall 12 from the adhesive filler 22 beforehand, as shown in drawing 7 before filling up the upper half 4 with the adhesive filler 22, The adhesive filler 22 is prevented by the dam material 23, and can prevent effectively the inflow of the adhesive filler 22 into the seat part 4b.

[0027]When the circuit board 6 is attached to the upper half 4, the volume of the chip 7 is calculated to the lower half's 4 capacity, and the fill ration of the adhesive filler 22 is decided so that the adhesive filler 22 may not begin to leak from the upper half 4.

[0028]By forming the striation 24 which is parallel with a rear-face longitudinal direction as shown to the upper half 4 at drawing 8, When the circuit board 6 is forced and attached to the upper half 4 filled up with the adhesive filler 22, the adhesive filler 22 flows easily along with the striation 24, and the adhesive filler 22 can be made uniformly full by this in addition to the

upper half's 4 slide switch seat part 4b. It may be the circular slot 24a as shown in drawing 9 a as shape of the striation 24, or as shown in drawing 9 b, V groove 24b may be sufficient, and the shape of another quirk may have.

[0029]As another filling method filled up with the adhesive filler 22 in the upper half 4 to whom the chip 7 corresponds, As shown in drawing 10 and drawing 11 a, the upper half's 4 rear face is formed in the plurality 25a, 25b, and 25c, for example, three compartments, with the bridge wall 25. According to the capacity of the chip corresponding to each compartments 25a, 25b, and 25c, the fill ration of the adhesive filler of the thermosetting filler with which it is filled up to each compartment 25a, 25b, and 25c is adjusted. For example, since the capacity of the chip corresponding to the compartment 25a is small, the adhesive filler 22 serves as many fill rations, Since the capacity of the chip corresponding to the compartment 25b is large, the adhesive filler 22 serves as a small fill ration, and since the capacity of the chip corresponding to the compartment 25c is small, an adhesive filler serves as many fill rations.

[0030]Thus, without the adhesive filler 22 leaking and coming out from a compartment by adjusting the fill ration of the adhesive filler 22 according to each compartments 25a, 25b, and 25c, when the circuit board 6 is attached to the upper half 4, as shown in drawing 11 b, it can be made certainly full to each compartment.

[0031]In this way, after the upper half 4 and the circuit board 6 are attached next, the dam material 23 which covered the window hole 16 side of a contact button from the rib wall 17 which surrounds the seat part 5b of a slide switch to the lower half 5 as shown in drawing 12, and was applied to the upper half 4, and the dam material 27 which has the same viscosity are applied, Then, as shown in drawing 6 c, the specified quantity restoration of the adhesive filler 28 is changed into a potting state into the lower half's 5 rear face. This adhesive filler 28 also has the same viscosity as the adhesive filler 22, and it stops at a filling state in the shape of potting, without flowing out all over the lower half 5. And it unites and attaches, carrying out facing down of the circuit board 6 to the lower half 5, and forcing on him the upper half 4 who attached the circuit board 6, as previously shown in drawing 6 b. By this attachment operation, as it flows all over the lower half 5 and is shown in drawing 6 d, it is full of the adhesive filler 28 in [of the lower half 5 / whole] space, and the memory card by this invention is attached.

[0032]Under the present circumstances, the adhesive filler 28 which it was full of in the lower half's 5 space is prevented by the dam material 27, and is kept from flowing into the slide switch 9 and contact button 11 side of the circuit board 6.

[0033]By forming the striation 29 in the lower half's 5 rear face as well as the upper half's 4 case along with a longitudinal direction, The adhesive filler 28 flows easily along with the striation 29, and the adhesive filler 28 can be made uniformly full by this in addition to the lower half's 5 slide switch seat part 5b.

[0034]The lower half's 5 capacity is calculated and the fill ration of the filler 28 is decided so

that the filler 25 may not begin to leak from the lower half 5 in this case.

[0035]The memory card attached in this way as shown in drawing 6 d holds the state where it united by a presser-foot means by which the upper half 4 and the lower half 5 are not illustrated, supplies it in a 70 ** heating furnace for 30 minutes, and performs curing treatment of the adhesive fillers 22 and 28. Then, it supplies in a 100 ** heating furnace for 3 to 4 hours in the state where the upper half 4 and the lower half 5 are pressed down, and there is no means. The memory card 1 unified by this with the adhesive fillers 22 and 28 which the upper half 4, the lower half 5, and the circuit board 6 hardened thoroughly is manufactured. Since the curing temperature of the adhesive fillers 22 and 28 is 100 ** or less, it does not produce the shape distortion by softening by the up-and-down halves 4 and 5 being fabricated from polybutylene terephthalate, either.

[0036]Since the memory card 1 manufactured as mentioned above is the composition the circuit board 6 in which the chip 7 was mounted is thoroughly sealed with the thermosetting adhesive fillers 22 and 28, the exterior is carried out by the upper half 4 and the lower half 5, and it was made to unify, Since thickness of the upper half 4 and the lower half 5 can be made very thin, microminiaturization can be attained with ultra-thin mold-ization as the memory card 1, and the intensity to bending stress and twist stress serves as a reliable memory card which improved extremely and fitted portable especially.

[0037]By what the chip 7 by which raise in basic wages mounting was carried out is thoroughly sealed by the circuit board 6 for with the adhesive fillers 22 and 28. It can be protected from degradation by the ultraviolet rays of the chip 7 by which raise in basic wages mounting was carried out from the first that the reliability of the soldering fixation part of the circuit board 6 and the chip 7 can improve, and, moreover, it can be protected also from external damages, such as an electrostatic discharge damage.

[0038]The striation 24 formed in the rear face of the upper half 4 or the lower half 5 and 29, From the first, that directivity is given to the flow of an adhesive filler and it can be uniformly filled up to a half does not have weld (joined part when a filler joins from a different direction) generating of a filler, either, and by this. Since the particles of a filler can be aligned, improvement in intensity when curing treatment of the adhesive filler is carried out can be aimed at.

[0039]Various modification implementation is possible for this invention within limits which are not limited to the embodiment which was mentioned above and shown in the drawing, and do not deviate from the gist.

[0040]Although the adhesion of the upper half 4, the lower half 5, and an adhesive filler can raise adhesion strength using surface area being expanded by the striation 24 formed in order to give directivity to the flow of a filler, and 29, In addition, what is called blasting that has rugged surfaces, such as a crimp, in a half side is performed, and it may be made to plan

adhesion strength.

[0041]It is widely applicable even if it is a surface mount of a package component or raise in basic wages parts, or the De Dis lied mounting as a mounting component to the circuit board 6.

[0042]Although this example explained the case where chip 7 grade was mounted in the whole surface of the circuit board 6, it can manufacture by the same procedure as the forming process mentioned above, of course even if it was that chip 7 grade is mounted in both sides of the circuit board 6.

[0043]It may be attaching the circuit board 6 to the lower half 5 filled up with the adhesive filler 28 previously as a molding procedure of the memory card 1, attaching the component-side side of the circuit board 6 to the upper half 4 filled up with the adhesive filler 22 after this, and unifying.

[0044]Although characterized by pinching the circuit board 6 and unifying by the upper half 4 and the lower half 5 who filled up the thermosetting adhesive filler with the embodiment of this invention, It is also possible to be filled up with an adhesive filler by pouring in the space of both the halves 4 and 5 and the circuit board 6 which inserted, united and staged the circuit board 6 after this by the upper half 4 and the lower half 5 as an option. In this case, the dam material is beforehand formed like the above-mentioned so that an adhesive filler may flow into neither the slide switch 9 nor the contact button 11.

[0045]

[Effect of the Invention]As explained above, the recording-medium card by this invention, It has an outer jacket case constituted by the union type by the upper half and a lower half, and the circuit board in which the chip etc. are mounted, By filling up the inner surface of the upper half of an outer jacket case, and a lower half with a thermosetting filler, pinching the circuit board and uniting by this upper half and lower half. Since it was made to unify an outer jacket case and the circuit board with a thermosetting filler, microminiaturization and slimming down are enabled, and it has the intensity which can fully be borne to external stress, such as bending stress and twist stress, and becomes a recording-medium card useful to carry.

[0046]The manufacturing method of the recording-medium card by this invention, By filling up the upper half and lower half inner surface of an outer jacket case with a thermosetting filler, pinching the circuit board, uniting by this upper half and lower half, and heat-treating and hardening a thermosetting filler. Since it was made to be unified with the thermosetting filler which an outer jacket case and the circuit board hardened, microminiaturization and slimming down are enabled, it has the intensity which can fully be borne to external stress, such as bending stress and twist stress, and a recording-medium card useful to carry can be manufactured.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention]Use this invention, for example for PC cards, such as a memory card, and it enables microminiaturization and slimming down in detail about a suitable recording-medium card and a manufacturing method for the same, and it relates to a recording-medium card excellent in bending stress and twist stress, and a manufacturing method for the same.

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PRIOR ART

[Description of the Prior Art]The insertion and detachment to the electronic equipment device of the exteriors, such as recent years, for example, computer apparatus, and AV (Audio Visual) apparatus, are enabled, and the portable recording-medium card which contained semiconductor memory and a control circuit has spread. In detail, this kind of recording-medium card carries out the exterior of the circuit board which mounted chips, such as semiconductor memory, in the substrate and constituted the electronic circuit with the outer jacket case which consists of plastic-molding material which consists of an upper half and a lower half, and is constituted.

[0003]Drawing 13 is a perspective view of the separation state of the memory card in which an example of the recording-medium card mentioned above was shown. The numerals 30 are an upper half who constitutes the one side of an outer jacket case, and a lower half from whom 31 constitutes the other side of an outer jacket case, and the numerals 32 are the circuit board in which the exterior is done by these both the halves 30 and 31. Raise in basic wages mounting of the chips 33, such as semiconductor memory, is carried out at the rear face of this circuit board 32 at the letter of nakedness, and the electronic circuit is constituted.

[0004]The tooling holes 35 and 35 are positioned by the gage pins 34 and 34 formed in the lower half 31, and the circuit board 32 is stored here, The upper half 30 is joined to this lower half 31, by carrying out ultrasonic welding of the planes of composition 30a and 31a of both the halves' 30 and 31 peripheral part, it unites to one and a memory card is constituted. The contact button 36 is formed in the end side rear face of the circuit board 32, and this contact button 36 is exposed from the window hole 37 formed in the lower half 31, and is electrically connected with an external electronic equipment device. 50 mm and length W_2 of the transverse direction are 21.5 mm, and, as for the memory card constituted in this way, length W_1 of a longitudinal direction of thickness D_1 is 2.8 mm.

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EFFECT OF THE INVENTION

[Effect of the Invention]As explained above, the recording-medium card by this invention, It has an outer jacket case constituted by the union type by the upper half and a lower half, and the circuit board in which the chip etc. are mounted, By filling up the inner surface of the upper half of an outer jacket case, and a lower half with a thermosetting filler, pinching the circuit board and uniting by this upper half and lower half. Since it was made to unify an outer jacket case and the circuit board with a thermosetting filler, microminiaturization and slimming down are enabled, and it has the intensity which can fully be borne to external stress, such as bending stress and twist stress, and becomes a recording-medium card useful to carry.

[0046]The manufacturing method of the recording-medium card by this invention, By filling up the upper half and lower half inner surface of an outer jacket case with a thermosetting filler, pinching the circuit board, uniting by this upper half and lower half, and heat-treating and hardening a thermosetting filler. Since it was made to be unified with the thermosetting filler which an outer jacket case and the circuit board hardened, microminiaturization and slimming down are enabled, it has the intensity which can fully be borne to external stress, such as bending stress and twist stress, and a recording-medium card useful to carry can be manufactured.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]By the way, since the memory card mentioned above is the structure where ultrasonic welding of the peripheral part plane of composition of up-and-down both the halves 30 and 31 that are doing the exterior of the circuit board 32 is carried out and up-and-down both the halves 30 and 31 the very thing are moreover also thin meat, For example, the intensity which has a limit to geometric moments of inertia, such as bending stress, twist stress, etc. of a memory card, and can be borne to what is called external stress is insufficient.

[0006]The method of carrying out ultrasonic welding of up-and-down both the halves' 30 and 31 peripheral part plane of composition also has a thing of both halves other than a plane of composition for which a center portion in particular cannot swell up, or it cannot dent conversely, and size specification of the memory card itself cannot be satisfied.

[0007]In the method by ultrasonic welding, breakage of the chip mounted for example, on the circuit board by high frequency oscillation may be produced.

[0008]An object of this invention is to have been made in order to cancel SUBJECT which was mentioned above, to have sufficient intensity to external stress, such as bending stress and twist stress, and to obtain a recording-medium card with which it can be satisfied of the size specification of a card, and a manufacturing method for the same.

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MEANS

[Means for Solving the Problem]In order to attain the above-mentioned purpose, a recording-medium card by this invention, It has an outer jacket case constituted by union type by upper half and a lower half, and the circuit board in which a chip etc. are mounted, An inner surface of an upper half of an outer jacket case and a lower half is filled up with a thermosetting filler, and it is made to unify an outer jacket case and the circuit board with a thermosetting filler by pinching the circuit board and uniting by this upper half and lower half.

[0010]According to the recording-medium card mentioned above, the mold of the chip etc. which were mounted with the circuit board is carried out with a thermosetting filler, and an outer jacket case and the circuit board by being unified with a thermosetting filler of electric insulation. It can have the intensity which can fully be borne to external stress, such as bending stress of a recording-medium card, and twist stress. And since it is sealed with a thermosetting filler, a lead terminal of a chip can be protected from an open circuit with moisture proof and a waterproof function of a chip etc.

[0011]A recording-medium card of this invention forms a dam material of viscous high thermosetting resin in a contact button and a half inner surface of a boundary part with a part of switch, it does not fill up with a thermosetting filler to a contact button and a part of switch, and it is making it.

[0012]A recording-medium card of this invention is forming a muscle-like slot in a rear-face longitudinal direction of an upper half of an outer jacket case, and a lower half, and enables equalization of the directivity of a flow of a thermosetting filler, and a fill ration.

[0013]A recording-medium card of this invention forms two or more compartments for a half rear face corresponding [side in which a chip was mounted] with a bridgewall, and adjusts a fill ration of a thermosetting filler to the compartment concerned according to capacity of a chip corresponding to each compartment.

[0014]A manufacturing method of a recording-medium card of this invention, It is a

manufacturing method of a recording-medium card which stored the circuit board which mounted a chip in the exterior chassis inside of the body of a union type which consists of an upper half and a lower half, An upper half and a lower half inner surface of an outer jacket case are filled up with a thermosetting filler, and by this upper half and lower half, the above-mentioned circuit board is pinched, and it unites, and is unified by heat-treating and hardening a thermosetting filler with a thermosetting filler which an outer jacket case and the circuit board hardened.

[0015]A manufacturing method of a recording-medium card of this invention forms a dam material of viscous high thermosetting resin in a contact button and a half inner surface of a boundary part with a part of switch, it does not fill up with a thermosetting filler to a contact button and a part of switch, and it is making it.

[0016]

[Embodiment of the Invention]Hereafter, the embodiment of a recording-medium card by this invention and a manufacturing method for the same is described with reference to drawings taking the case of a memory card and a manufacturing method for the same.

[0017]The appearance perspective view as which drawing 1 regarded the memory card from the surface side, the appearance perspective view which similarly looked at drawing 2 from the rear-face side, The appearance perspective view of the separation state of the upper half, the lower half, and the circuit board whose drawing 3 is an outer jacket case of a memory card, the appearance perspective view as which drawing 4 regarded the upper half from the rear-face side, and drawing 5 are the A-A line expanded sectional views of drawing 1.

[0018]The numerals 1 show the whole memory card and the arrow marker 2 shows the path-of-insertion side of the memory card 1. The outer jacket case 3 of the memory card 1 is constituted from two sheets' half of the upper half 4 and the lower half 5 by the union type, chemical resistance and a mechanical strength are high, for example, injection molding of the outer jacket case 3 is carried out from polybutylene terephthalate (PBT). Here, as for length W_4 of the neighborhood of the transverse direction to which 31 mm, the path of insertion, and length W_3 of the neighborhood of the longitudinal direction to which the size of the memory card 1 is parallel to the path of insertion cross at right angles, the standard of 20 mm and the thickness D_2 is carried out to 1.6 mm.

[0019]The circuit board 6 is built in in the outer jacket case 3 mentioned above. A circuit pattern is formed in the mother board which consists of glass epoxy boards, raise in basic wages mounting of two or more chips 7, such as semiconductor memory, is carried out at the upper surface side of this circuit board 6, and the circuit board 6 constitutes the electronic circuit. In the opening window 10, as the slide switch 9 for erroneous erasure prevention which has the change knob 8 for the data to semiconductor memory being write-protected to the

upper surface side of the circuit board 6, and setting up write-in **** straddles, it is mounted. Pattern formation of two or more contact buttons 11 is carried out to the tip part by the side of the path of insertion at the undersurface side of the circuit board 6.

[0020]Now, the upper half 4 of the outer jacket case 3 has the side attachment wall 4a in a peripheral part, as shown in drawing 4, and the rib wall 12 which surrounds the seat part 4b of the slide switch 9 mentioned above at the rear face is formed in the side attachment wall 4a and same height. The rib form projections 13 and 13 of the couple are formed in the upper half's 4 rear side attachment wall, and the locating lug 14 is formed in the upper half's 4 anterior part side. The numerals 15 are label area currently formed in the upper half's 4 surface.

[0021]The lower half 5 of the outer jacket case 3 has the side attachment wall 5a in a peripheral part, two or more slit shape window holes 16 are formed in the lower half's 5 tip side, and the contact button 11 of the circuit board 6 mentioned above from this window hole 16 is made to be exposed from the lower half's 5 undersurface. The rib wall 17 which surrounds the seat part 5b of the slide switch 9 mentioned above at the lower half's 5 rear face is formed, and the hole 18 which the change knob 8 of the slide switch 9 faces the lower half's 5 portion surrounded with this rib wall 17 is formed. The concave 20 which engages with the crevices 19 and 19 of the couple which engages with the lower half's 5 rear side attachment wall with the upper half's 4 rib form projections 13 and 13, and the upper half's 4 locating lug 14 is formed.

[0022]The circuit board 6 which is put by the upper half 4 and the lower half 5 of the outer jacket case 3, and is stored contacts on the surface part 16a of the lower half's 5 window hole 16, the upper surface of the rib wall 17, and the step 21 and 21, and he is trying for the undersurface of the circuit board 6 to have the lower half's 5 rear face, and a predetermined gap substantially here. For example, it sets like the impression plaster of the memory card 1 later mentioned in this gap and consists of thermosetting resin, it fills up with the adhesive filler of epoxy system resin.

[0023]The rib wall 12 contacts the upper surface of the circuit board 6, and the upper half 4. The side attachment wall 4a of the upper half's 4 peripheral part is joined to the side attachment wall 5a of the lower half's 5 peripheral part, and he is trying for the upper surface of the chip 7 mounted in the upper surface of the circuit board 6 and the slide switch 9 to have the upper half's 4 rear face, and a predetermined gap. It fills up with the adhesive filler of the epoxy system resin which sets like the impression plaster of the memory card 1 later mentioned between circuit board including this gap 6 absentminded, and consists of thermosetting resin.

[0024]Next, the manufacture procedure of the memory card 1 is explained with reference to drawing 6 a - drawing 6 d. The figure has shown the sectional view which cut the memory card

1 from the B-B line to the transverse direction in drawing 1.

[0025]First, as shown in drawing 6 a, the upper half 4 is made inside-out, and the specified quantity restoration of the adhesive filler 22 is changed into a potting state into this upper half's 4 rear face. It stops in the shape of potting, without this adhesive filler 22 being viscous in comparison, therefore flowing out all over the upper half 4 in a filling state. It attaches forcing it on the upper half 4 who placed the mounting side for the circuit board 6 which mounted the chip 7 and the slide switch (not shown) upside down in this way, and was filled up with the adhesive filler 22. By this attachment operation, as it flows all over the lower half 4 and is shown in drawing 6 b, it is full of the adhesive filler 22 in [of the circuit board 6 and the upper half 4 / whole] space.

[0026]Under the present circumstances, the adhesive filler 22 which it was full of in the upper half's 4 space was prevented with the rib wall 12 which surrounds the seat part 4b of the slide switch 9, and has prevented the inflow of the adhesive filler 22 to the slide switch 9 side. By applying the viscous high dam material 23 to the circumference of the rib wall 12 from the adhesive filler 22 beforehand, as shown in drawing 7 before filling up the upper half 4 with the adhesive filler 22, The adhesive filler 22 is prevented by the dam material 23, and can prevent effectively the inflow of the adhesive filler 22 into the seat part 4b.

[0027]When the circuit board 6 is attached to the upper half 4, the volume of the chip 7 is calculated to the lower half's 4 capacity, and the fill ration of the adhesive filler 22 is decided so that the adhesive filler 22 may not begin to leak from the upper half 4.

[0028]By forming the striation 24 which is parallel with a rear-face longitudinal direction as shown to the upper half 4 at drawing 8, When the circuit board 6 is forced and attached to the upper half 4 filled up with the adhesive filler 22, the adhesive filler 22 flows easily along with the striation 24, and the adhesive filler 22 can be made uniformly full by this in addition to the upper half's 4 slide switch seat part 4b. It may be the circular slot 24a as shown in drawing 9 a as shape of the striation 24, or as shown in drawing 9 b, V groove 24b may be sufficient, and the shape of another quirk may have.

[0029]As another filling method filled up with the adhesive filler 22 in the upper half 4 to whom the chip 7 corresponds, As shown in drawing 10 and drawing 11 a, the upper half's 4 rear face is formed in the plurality 25a, 25b, and 25c, for example, three compartments, with the bridge wall 25, According to the capacity of the chip corresponding to each compartments 25a, 25b, and 25c, the fill ration of the adhesive filler of the thermosetting filler with which it is filled up to each compartment 25a, 25b, and 25c is adjusted. For example, since the capacity of the chip corresponding to the compartment 25a is small, the adhesive filler 22 serves as many fill rations, Since the capacity of the chip corresponding to the compartment 25b is large, the adhesive filler 22 serves as a small fill ration, and since the capacity of the chip corresponding to the compartment 25c is small, an adhesive filler serves as many fill rations.

[0030]Thus, without the adhesive filler 22 leaking and coming out from a compartment by adjusting the fill ration of the adhesive filler 22 according to each compartments 25a, 25b, and 25c, when the circuit board 6 is attached to the upper half 4, as shown in drawing 11 b, it can be made certainly full to each compartment.

[0031]In this way, after the upper half 4 and the circuit board 6 are attached next, the dam material 23 which covered the window hole 16 side of a contact button from the rib wall 17 which surrounds the seat part 5b of a slide switch to the lower half 5 as shown in drawing 12, and was applied to the upper half 4, and the dam material 27 which has the same viscosity are applied, Then, as shown in drawing 6 c, the specified quantity restoration of the adhesive filler 28 is changed into a potting state into the lower half's 5 rear face. This adhesive filler 28 also has the same viscosity as the adhesive filler 22, and it stops at a filling state in the shape of potting, without flowing out all over the lower half 5. And it unites and attaches, carrying out facing down of the circuit board 6 to the lower half 5, and forcing on him the upper half 4 who attached the circuit board 6, as previously shown in drawing 6 b. By this attachment operation, as it flows all over the lower half 5 and is shown in drawing 6 d, it is full of the adhesive filler 28 in [of the lower half 5 / whole] space, and the memory card by this invention is attached.

[0032]Under the present circumstances, the adhesive filler 28 which it was full of in the lower half's 5 space is prevented by the dam material 27, and is kept from flowing into the slide switch 9 and contact button 11 side of the circuit board 6.

[0033]By forming the striation 29 in the lower half's 5 rear face as well as the upper half's 4 case along with a longitudinal direction, The adhesive filler 28 flows easily along with the striation 29, and the adhesive filler 28 can be made uniformly full by this in addition to the lower half's 5 slide switch seat part 5b.

[0034]The lower half's 5 capacity is calculated and the fill ration of the filler 28 is decided so that the filler 25 may not begin to leak from the lower half 5 in this case.

[0035]The memory card attached in this way as shown in drawing 6 d holds the state where it united by a presser-foot means by which the upper half 4 and the lower half 5 are not illustrated, supplies it in a 70 ** heating furnace for 30 minutes, and performs curing treatment of the adhesive fillers 22 and 28. Then, it supplies in a 100 ** heating furnace for 3 to 4 hours in the state where the upper half 4 and the lower half 5 are pressed down, and there is no means. The memory card 1 unified by this with the adhesive fillers 22 and 28 which the upper half 4, the lower half 5, and the circuit board 6 hardened thoroughly is manufactured. Since the curing temperature of the adhesive fillers 22 and 28 is 100 ** or less, it does not produce the shape distortion by softening by the up-and-down halves 4 and 5 being fabricated from polybutylene terephthalate, either.

[0036]Since the memory card 1 manufactured as mentioned above is the composition the circuit board 6 in which the chip 7 was mounted is thoroughly sealed with the thermosetting

adhesive fillers 22 and 28, the exterior is carried out by the upper half 4 and the lower half 5, and it was made to unify, Since thickness of the upper half 4 and the lower half 5 can be made very thin, microminiaturization can be attained with ultra-thin mold-ization as the memory card 1, and the intensity to bending stress and twist stress serves as a reliable memory card which improved extremely and fitted portable especially.

[0037]By what the chip 7 by which raise in basic wages mounting was carried out is thoroughly sealed by the circuit board 6 for with the adhesive fillers 22 and 28. It can be protected from degradation by the ultraviolet rays of the chip 7 by which raise in basic wages mounting was carried out from the first that the reliability of the soldering fixation part of the circuit board 6 and the chip 7 can improve, and, moreover, it can be protected also from external damages, such as an electrostatic discharge damage.

[0038]The striation 24 formed in the rear face of the upper half 4 or the lower half 5 and 29, From the first, that directivity is given to the flow of an adhesive filler and it can be uniformly filled up to a half does not have weld (joined part when a filler joins from a different direction) generating of a filler, either, and by this. Since the particles of a filler can be aligned, improvement in intensity when curing treatment of the adhesive filler is carried out can be aimed at.

[0039]Various modification implementation is possible for this invention within limits which are not limited to the embodiment which was mentioned above and shown in the drawing, and do not deviate from the gist.

[0040]Although the adhesion of the upper half 4, the lower half 5, and an adhesive filler can raise adhesion strength using surface area being expanded by the striation 24 formed in order to give directivity to the flow of a filler, and 29, In addition, what is called blasting that has rugged surfaces, such as a crimp, in a half side is performed, and it may be made to plan adhesion strength.

[0041]It is widely applicable even if it is a surface mount of a package component or raise in basic wages parts, or the De Dis lied mounting as a mounting component to the circuit board 6.

[0042]Although this example explained the case where chip 7 grade was mounted in the whole surface of the circuit board 6, it can manufacture by the same procedure as the forming process mentioned above, of course even if it was that chip 7 grade is mounted in both sides of the circuit board 6.

[0043]It may be attaching the circuit board 6 to the lower half 5 filled up with the adhesive filler 28 previously as a molding procedure of the memory card 1, attaching the component-side side of the circuit board 6 to the upper half 4 filled up with the adhesive filler 22 after this, and unifying.

[0044]Although characterized by pinching the circuit board 6 and unifying by the upper half 4

and the lower half 5 who filled up the thermosetting adhesive filler with the embodiment of this invention, It is also possible to be filled up with an adhesive filler by pouring in the space of both the halves 4 and 5 and the circuit board 6 which inserted, united and staged the circuit board 6 after this by the upper half 4 and the lower half 5 as an option. In this case, the dam material is beforehand formed like the above-mentioned so that an adhesive filler may flow into neither the slide switch 9 nor the contact button 11.

[Translation done.]

* NOTICES *

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is the appearance perspective view which looked at the memory card by the embodiment of this invention from the upper surface side.

[Drawing 2]It is the appearance perspective view which similarly looked at the memory card from the undersurface side.

[Drawing 3]It is an appearance perspective view in the state where the memory card was separated.

[Drawing 4]It is the appearance perspective view which looked at the upper half of the outer jacket case from the rear-face side.

[Drawing 5]It is the expanded sectional view which cut the memory card from the A-A line of drawing 1.

[Drawing 6]a It is a sectional view before attachment of the circuit board for the upper half filled up with the adhesive filler.

It is the sectional view which attached the circuit board to b upper half.

It is the sectional view which filled up c lower half with the adhesive filler.

It is the sectional view which attached the upper half to the lower half filled up with d adhesive property filler with the circuit board.

[Drawing 7]It is a back view of the upper half who formed the dam material in the surroundings of a rib wall.

[Drawing 8]It is a back view of the upper half in which the striation was formed at the half rear face.

[Drawing 9]a It is a partial expanded sectional view of an example of a striation.

It is a partial expanded sectional view of another example of b striation.

[Drawing 10]It is a back view of the upper half who showed another example filled up with an adhesive filler for every compartment.

[Drawing 11]a It is a sectional view before attachment of the circuit board at the upper half who similarly filled up the compartment with the adhesive filler.

It is the sectional view which attached the circuit board to b upper half.

[Drawing 12]It is a back view of the lower half who formed the dam material in the surroundings of a rib wall and a contact button.

[Drawing 13]It is an appearance perspective view of the separation state of the conventional memory card.

[Description of Notations]

1 [-- A lower half, 6 / -- Circuit board,] -- A memory card, 3 -- An outer jacket case, 4 -- An upper half, 5 7 [-- An upper half's rib wall, 17 / -- A lower half's rib wall, 22 28 / -- An adhesive filler, 23 27 / -- A dam material, 24, 29 / -- A striation, 25 / -- A bridge wall, 25a 25b, 25c / -- Compartment] -- A chip, 9 -- A slide switch, 11 -- A contact button, 12

[Translation done.]